





AN

INAUGURAL DISSERTATION

ON RABIES CANINA;

SUBMITTED TO THE CONSIDERATION

OF

THE HONOURABLE ROBERT SMITH, PROVOST,

AND OF THE

REGENTS OF THE UNIVERSITY OF MARYLAND,

✓  
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Of Winchester, Virginia, Member of the Baltimore Medical Society.

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*Heu Mihi! tot Mortes homini quot Membra Malisqve,  
Tot sumus infecti, Mors ut Medicina putetur.....Linnæus.*

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## INTRODUCTION.

IN the following observations on canine madness, the author is conscious, that although the peculiar malignity of the disease, and the interest with which it is from this circumstance invested, are motives which invite to its examination, yet the doubt and obscurity in which it is involved, and from which the efforts of genius and experience have as yet been inadequate to rescue it, ought perhaps to be sufficient to deter him from any disquisition.

To a graduate in medicine, it is perhaps sufficient praise to have escaped censure. And if, in the brief course of his remarks, he has been fortunate enough to offer one fact, or suggest one observation on which superior talent or better experience may build, he will account himself sufficiently rewarded.



## RABIES CANINA.

MEDICINE, in common with other sciences, has suffered much from the ambiguity and indefinite application of terms : of this, the subject of this essay, furnishes abundant evidence. This disease, from one of its most prominent symptoms, a dread of water, has been called hydrophobia ; and rabies canina, from its being produced by the canine *virus*. I adopt the latter term, though not unexceptionable, because I consider it more so than the former ; the latter designating the uniform, and indeed only remote cause of the disease, while the former misleads by exhibiting that for the disease, which is but a prominent symptom.

### HISTORY OF THE DISEASE, AND THE REMOTE CAUSES IN DOGS.

UNTIL the time of Celsus Aurelianus, who flourished in the reign of Hadrian and Trajan, medical history exhibits no trace of the existence of this disease : that it prevailed, however, before the time of that author, seems evident from his having devoted a whole chapter to the discussion of the question, whether the disease was of ancient or modern origin. But all writers have agreed that Homer has fixed the æra of its rise, anterior to his day, by that passage in the 9th Iliad, where he compares the vehement rage of Hector, to the fury of canine mad-

ness. The result of the most sedulous researches, into the remote ages of antiquity, in order to develop the precise period in which certain diseases originated, while it is uncertain and unsatisfactory, affords us few principles of much practical utility. The earlier records of medicine were little more than a display of the ignorance and superstition of those times.

Almost all animals are liable to the canine disease in a derivative way ; but its spontaneous production is confined to the canine race. It is true, that Boerhaave has given credit to the idea that domesticated fowls are subject to it, without receiving the infection from any other animal. And Morgagni and some others, have supposed that the cat genus was also liable to be spontaneously affected. But the result of subsequent, and probably more accurate observation, has been such as to discredit the opinion, and confirm the position, that no race of animals, except the canine, are spontaneously affected with this disease. When canine madness prevailed, as an epidemick in the West Indies, its ravages appeared to be confined to the dogs, except that other animals received it in the ordinary way of communication. Certain diseases seem to be peculiar to certain animals : thus the venereal disease cannot be communicated to inferior animals, as appears from the experiments of Doctor Hunter.

A variety of remote causes have been assigned by different writers, for the production of canine madness in those animals to which it is peculiar, of some of which it may be proper to take a cursory view.

1st, Putrid aliment.

2nd, A deficiency of water.

3th, Atmospherick influence.



These are the principal agents to which has been attributed the production of this disease. Some of which are of doubtful application.

1st, If putrid aliment were an efficient cause, we should have the disease occurring more frequently, and constantly than is agreeable to observation, and indeed dogs have been known to feed upon putrid aliment, and even to devour the bodies of other animals that had died of canine madness, without being disordered.

2d, A deficiency of water. Notwithstanding the antiquity of this opinion, it cannot be received without some hesitation from the fact, that the disease is rarely seen in those islands in which there is always a deficiency of water, as in the island of Antigua.

3d, Atmospherick influence, may perhaps be considered as the most active agent in the production of this disease : excessive heat and cold are those qualities of the air which have been supposed to engender it ; but a more probable opinion is, that the alternation of these two states is more hurtful than the continued action of either. That some peculiarity in the constitution of the atmosphere, is the efficient cause, will appear from the disease occurring as an epidemick. In 1783, it prevailed in Jamaica and Hispaniola, in neither of which islands had it occurred for forty or fifty years, or perhaps ever, before.\* The disease is said also by Ulloa to be unknown on the vast continent of South America,† and Volney says it never occurred in Egypt. The main design of this essay, however, was not to delineate the disease as it occurs in dogs, but to investigate its character as it displays itself in the human species.

\* Mosely on Tropical Diseases, p. 44.

† Do.

## THE REMOTE CAUSES IN THE HUMAN KIND.

A VARIETY of remote causes have been enumerated by the ancients, and received with confidence and respect by the moderns. The opinion that this disease arose spontaneously, or independently of the agency of the canine virus, was maintained by Aurelius and Celsus, and supported by Boerhaave and his commentator Van Swieten. Notwithstanding, however, this high authority, and the zeal with which the opinion has been supported, its fallacy and inaccuracy appear to me to be sufficiently obvious. The bare enumeration of those various causes, must at once impress us with the idea, that the hydrophobick symptom has been the prolific source of error; for every disease in which the patient was incapable of swallowing liquids, was believed to be canine madness, and of consequence the cause that produced the disease, of which hydrophobia was an accidental symptom, added to the catalogue of remote causes. Thus Boerhaave relates a case of ardent fever, produced by exposure to a hot sun, and drinking nothing but ardent spirits, as a cause of spontaneous hydrophobia.\* Inflammation of the stomach,† wounds in the tendinous parts,‡ hysteria,|| and vicissitudes of the weather, have all been enumerated as remote causes of this disease. Dr. Arthaud relates three cases produced by the latter causes in the West Indies: but from the resemblance which tetanus bears to this disease, particularly in regard to the hydrophobick symptom, and from tetanus being so frequently in-

\* Van Swieten's Commentaries.

† Medical Essays, vol. 6.

‡ Zoonomia.

• || Medical Commentaries, vol. 6, p. 329.

duced in those hot climates by this cause, it is highly probable the doctor was mistaken, and that these were cases of tetanus. The impropriety of detailing these as remote causes, and the cases enumerated as cases of the disease in question, is too glaring to merit much attention: with as much propriety might the plague be called lues venerea, and the small pox identified with intermittent fever, because there exist certain signs similar, in both I therefore reject all the remote causes which have been enumerated, and consider the canine *virus*, as the only efficient cause in the production of this disease, and which designates it from all others by an assemblage of symptoms peculiar to itself, as well as by its pre-eminent power and mortality.

The medium through which the *virus* acts in producing a disease so horrible in its aspect, and destructive in its nature, has not escaped the enquiry of physicians.—The ancients supposing it to be the most subtle, penetrating poison, imagining the sphere of its deleterious influence to be very extensive, and that the system was liable to be assailed successfully, from almost every point. The various avenues through which the disease is said to have been imparted, are :

1st, Through the lungs, from the saliva becoming volatile and being inhaled.

2d, The application of the saliva to the surface of the body.

3d, Through the stomach.

The circumstance of the attendants of the sick in this disease escaping it, although exposed to the exhalations from their bodies in the most concentrated form, and also to the contact of the saliva, argues very strongly against the first and the second. With regard to its conveyance

through the stomach : besides that the flesh of rabid animals has been eaten with impunity ; we should conclude from analogy, that the disease could not be imparted through the stomach, from its having been ascertained by experiment that the venereal *virus*, the variolous matter, and the poison of the viper can be swallowed without injury, in this respect differing materially from vegetable poison, which are immediately hurtful when applied to the stomach.

It is now satisfactorily ascertained, that the disease can only follow the application of the *virus* by means of a wound or an abraded surface ; after however the *virus* is applied, under these circumstances a question arises, does it act immediately on the nerve, or is it taken into the system by absorption ?

During the reign of the *humoral* pathology when all diseases were referred to certain morbid changes induced in the fluids, the lymphaticks were considered as the avenues through which substances hostile to the healthy operations of the animal economy found admittance into the body ; but modern physiology has discarded the chymical notions of fermentation and assimilation ; the fluids are considered of but secondary importance, and the nervous system believed to be the “ seat and throne” of diseases, as well as of the vital principle. That the absorbents are the avenues through which contagion, infection, and indeed all poisons assail the living system, is an opinion that still generally obtains ; but the grounds upon which it rests, are at least very problematical, if not entirely untenable.

The ingenious Dr. Cullen deviates from his usual path of accurate investigation when he attempts, in treating of the small-pox to found the whole pathology of the disease

on the assimilating powers of the variolus infection. Experiments have demonstrated that the small-pox, and even the venereal disease, cannot be communicated by means of the blood. Thus I infer, not only from analogy, that the canine *virus* is not taken into the system by absorption, but from the known operations of the absorbents themselves which seem to possess a kind of discriminating faculty and intelligence,\* by which they separate substances that are nutritious from those that are excrementitious and hurtful. Experiments instituted with a view of detecting medicines in an active state in the circulation have failed; from which it would appear that no substances can possibly enter into the circulation unless they had first undergone a digestive or assimilating process. The mildest substances injected into the arteries have speedily thrown into disarray all the powers of the system in these animals on which the experiments have been tried. But even admitting that the poison is taken up by the absorbents; and that the system was not disturbed immediately by any foreign substance being conveyed into the circulation, it should seem from the length of time which generally intervenes between the reception of the bite and the accession of the disease, that the frequent revolutions of the virus with the fluids would change its chymical qualities and render it inert or at least less potent by dilution, or, if it remained active, that its deleterious influence would be exerted upon the glands through which it must necessarily pass; which is not found to be the case.

I suppose, therefore, that the operation of the poison is immediately upon the nerves to which it may be applied; its influence being propagated by its specific powers along the course of the nerve until it invades the

\* Hunter.



*sensorium*. The idea of Drs. Mease and Darwin of the "virus remaining local in the part injured until some cause excites it into action," is, as it seems to me, at variance with sound sense, the disease having occurred after the part bitten has undergone frequent and thorough ablutions, and indeed very frequently after the operation of excision and the use of the caustick. This was the case in one instance in Alexandria, and medical records afford many cases to substantiate the fact. The nature of all poisons and indeed of the causes of almost all diseases are enveloped in obscurity: on this subject the severest philosophical scrutiny has amounted only to speculation and fanciful hypothesis, the ingenious doctor Brown and his followers have resolved the ætiology of all diseases into a stimulant operation, whilst others admitting the existence of sedatives, deduce the pathology of many diseases from this principle. The former hold it as a fundamental principle, that "all substances applied to the human body differ not in their nature but only in the force, frequency, and diffusibility of their operation:" this principle may appear at the first view to be the result of faithful induction, but from strict analysis will be found to be the offspring of false reasoning and contrary to our knowledge of facts.

It would scarcely, I think, be asserted by the advocates of this system, that the mildest nutritious articles of diet and those that are considered as poisonous, are the same in their nature, since under every form of exhibition one not more certainly destroys animal life, than the other supports and perpetuates it. Can there be discovered any striking features of resemblance in the general action of mercury and of the preparations of lead and arsenick? Has the intermittent fever ever exhibited the phe-

nomena of small-pox ; the measles assumed the virulent nature of lues, or the rabies canina ever mellowed into hysteria ? If morbid changes, therefore, are uniformly different in their features it seems absurd to contend for the identity of their causes, and hence our conclusion is, that the *canine virus* possesses a specifick character of a destructive or sedative nature which exerts its deleterious influence specifically upon the nervous system : in thus supposing the *virus* to have a peculiar and exclusive bearing upon the nervous system, we are supported by the analogy of many other diseases, which apparently display a kind of elective attraction for certain of the general systems of the body : thus *scrophula* and the *lues venerea* entrench themselves in the lymphatick system ; the variolus infection and miasmata in the circulating, and the scabies in the cuticular ; and some others extend their empire over one or more, as the poison of the viper and of certain insects which effect the arterial as well as the nervous, but more particularly the nervous system. And again, certain medicines which are “poisons given by weight and measure,” exhibit a partiality for certain systems in preference to others—for instance: *Mercurey* holds an extensive dominion over the lymphatick, *asafœtida* and *castor* the nervous, and *digitalis* the arterial system.

The operation of the canine virus in producing this disease appears to be successful or not so, as there exists a proclivity in the system or state of predisposition to favour it : in what state of the nerves this may consist it may be difficult to explain. The proposition is, however, supported by the fact that, of a large number of persons who have been bitten by dogs labouring under madness, a very small proportion become affected by the

disease, although the circumstances in which they have been placed have been precisely similar. Of twenty cases that came under the observation of doctor Hunter, where the virus had been received from the same source, and in all of which no prophylactic efforts had been made, only one or two fell victims to the disease. This is confirmed by Dr. Vaughan; and Van Swieten long ago remarked, "that the *virus* produced different effects upon different temperaments or constitutions," thus favouring the idea of the predisposition of the system being necessary to the production of the disease.

An inviting state of the system appears to determine the accession of many other diseases, but is most observable in *tetanus*, a very small number of those who are subject to the causes of that disease becoming affected; this can only be explained by admitting a state of predisposition, which predisposition may consist in a peculiar irritability or mobility of the body, the disease recurring more frequently in those countries where the inhabitants are constantly exposed to the debilitating operation of a vertical sun. This predisposition I believe to consist in an *atony* or a deficiency of energy in the nervous system, for in proportion as the functions of the body shall be encumbered or lessened in their tone, in the same ratio of facility will morbid causes exert their influence in the production of disease. A remarkable instance in confirmation of this principle came under my own observation, in the case of a girl of 17 or 18, who had been subject to epilepsy; she was attacked with the bilious remittent fever to a violent degree, of which however she recovered; but during her convalescence her disease recurred with aggravated violence, the paroxysms now coming on every day; and I presume the observations of practitioners will



furnish evidence sufficient to establish this proposition. In this way I account for the fact mentioned in writers, the canine madness occurring immediately after the patient passed through other diseases subsequently to the reception of the bite. The various and indeterminate periods of the accession of the disease are referrible to the different degrees of predisposition prevailing in the bodies of the infected, together with the proximity of the bite to the sensorium, which must be allowed to have no inconsiderable influence, if the hypothesis of the gradual progression of diseased action from the point injured to the sensorium, be founded in truth. Ancient as well as modern writers have mentioned, without commenting on the fact, that wounds on the superior parts of the body are followed more certainly as well as more speedily by the disease, that those on the inferior portion of the system. I will add, that in symptomatick epilepsy, a morbid change commences in the extremity of a nerve, and travels to the brain when a paroxysm succeeds. This is not useless speculation, but a principle from which a practical lesson may be drawn in the method of averting this calamitous affection.

That the canine *virus* exerts its influence immediately on the *sensorium commune* is deducible from the most prominent features of the disease. These, (as they are displayed in the accession of the disorder,) are in most instances a yawning and stretching, *horripilatio*, inaptitude to motion, and great prostration of the spirits,—signs strongly indicative of the lessened vigour of the nervous energy. In the second place the excitability becomes morbidly increased, particularly on the surface of the body, and constitutes an exuberant source of torture to the unfortunate patient; the slightest impulse, (in the ad-

vanced stages of the disease,) occasions excruciating pain; the smallest breeze produces the most violent writhings and contortions of body, and the most inconsiderable exertion agitates and convulses the patient's whole frame: this symptom is bold in its character and universal in its appearance, that it might almost be appealed to as a pathognomonic sign of this disease. It arrested the attention of the earliest observers of canine madness, and has been remarked by every succeeding writer and practitioner. Celsus remarked, that shrill sounds disordered the patient: Van Swieten observes, that clear and reflecting bodies and the motion of the air were disagreeable to patients, and indeed dreaded by them; the agitations of the air occasioned by adjusting the bed clothes was complained of by one patient\*. Beumgaiton says, that injections, even when the patient knew nothing of the operation, produced the most violent agitations. In another case, a drop of vinegar rolling on the patient's side from a blister, produced the same violent effects; and in a case detailed by Dr. Physick,† confirmed by two which came under the observation of Dr. Dick, this symptom prevailed to a high degree: my own researches, indeed, have not furnished me with a solitary case in which this symptom has not been one of the most conspicuous: this, then, may be considered as another unequivocal sign, that the nervous system is the principal sufferer from this poison, and an indubitable evidence that, it is the result of a debilitating operation. The immediate effect of a stimulant agent continued for some time is an exhaustion of excitability preceded by violent excitement: neither of these states is presented to us in this disease. This mor-

\* Medical Commentaries, vol. 3, p. 296.

† Medical Repository.

bid irritability occurs in tetanus to such a degree that the smallest exertion as that of speaking, will produce the spasms. Hysteria also exhibits the same phenomena. Dr. Cullen observes, that persons liable to hysteria acquire such a degree of sensibility as to be strongly affected by the slightest impressions: this symptom has also been observed in the last stage of malignant fever, not arising in this case certainly from an inflammatory diathesis prevailing in the system, but indicating here, as in canine madness, the great prostration of the vital energies.

Thirdly, convulsions.—It will be obvious from some of the above phenomena, how connected and indeed dependent upon the morbid state of the nerves, is that state of the muscular fibre which disposes them to irregular action. I am aware, that the doctrine of spasm and convulsion has been drawn by some philosophers from the arterial system, and has been wielded as an argument against the theory I am attempting to support. That high arterial action is sometimes a cause of convulsions, may be admitted; but, even in this case, the pathology of the disease will grow out of the nervous system, which predisposes it to be affected by this cause. I think it is a principle in physiology which is established both by experiment and argument to which no valid objections can be reared, that the muscular fibres derive all their energies from the nervous system; disturb the function of a nerve and the fibres are disordered: dissever their connexion and they wither, although the circulation may be continued; the arteries themselves being only secondary instruments. Convulsions, therefore, must depend upon a morbid change in the sources from which the muscles derive their contractibility: the nature of this change we

are perhaps unacquainted with. Persons suffering under syncope, if kept in an erect position, will pretty certainly fall into convulsions: thus, in such cases, the prostrate position is the remedy and will, if applied in season, effectually prevent that unpleasant termination. Any sudden emotion or impression, as I have said above, upon any of the senses of hearing, seeing, or feeling, produced the most violent convulsions, and in these cases the muscles of respiration are particularly effected, so as sometimes almost to suspend that operation: the contraction at other times is so violent as to eject the *mucus* from the mouth with considerable violence. Celsus, compares the affection of respiration "to what takes place in boys unskilful in the art of swimming," (a happy illustration of what I shall endeavour to shew, gives occasion to that distressing affection called hydrophobia :) in the Medical Memoirs there is a case detailed in which universal convulsion was the consequence of the patient having been suddenly plunged into a warm bath; and every case on the records of medicine, furnishes evidences to the same effect; therefore, I think, that the convulsions in canine madness, depend upon the state of the nervous system.

This state of the nervous system, may lead us to a correct *rationale* of that symptom of this disease, which has occasioned so much speculation, viz. the dread of water, or more properly an incapacity of swallowing it; that this symptom may be referrible to the morbid excitability above spoken of, especially as existing in the sentient extremities of the nerves, will appear from what has been advanced with regard to the convulsions being in a great measure a consequence of this state, and from the same phenomena resulting from efforts to drink fluids, or from impressions or sudden emotions in some other way.



Thus when a vessel of water is brought to the lips of the patient, the impression occasions a sudden emotion, accompanied with convulsions and a strong inspiration of air, which passing through the liquid, divides its particles and produces a spray which is drawn into the windpipe, and strangles the patient ; hence, they are heard to exclaim, that their breath is taken from them by the effort. When the vessel is given to the patient himself, he brings it to his mouth with a hurried, agitated motion ; and the same phenomena are exhibited. In some cases, after the patient recovers from the first impression, he can swallow a considerable quantity without being disturbed, which fact favours the explanation I have given. In proportion, also, as the substance approximates to the solid consistence, is the facility with which the patient can swallow it, as the particles of a solid substance cannot be so easily separated by the sudden influx of air : this was observed by Celsus. This symptom has been attributed to a spasmodick affection of the muscles of deglutition : if this were the case, the patient would be equally incapable of swallowing solids as liquids, which we know not to be the fact, for solid food can almost always be swallowed, and, consequently physicians do generally exhibit their remedies in a solid form. In tetanus, where there is a spasmodick affection extending to the muscles of deglutition, neither solids nor liquids can be taken by the patient.

These facts may not be unaptly applied to another opinion as to the cause of this symptom, viz. that it arises from inflammation of the instruments of deglutition, and indeed the whole respiratory apparatus, and upon which the sthenick nature of canine madness, has been attempted to be established. But a moment's reflection upon the phenomena of inflammation, as they occur in

any of those organs, will satisfy, as no such phenomena occur in canine madness. Inflammation is a uniform and regular process, indicated always by heat, redness, pain, and swelling. Therefore the physical inconveniences arising from this state, would be constant and uniform, whether its existence in the *pharynx*, *trachea*, or lungs. But this uniformity does not appear in hydrophobia, the patient can swallow solids without pain, he breathes without difficulty or hoarseness, except during the paroxysms, there is no pain in the thorax indicative of a state of inflammation: in short, there occurs few, if any of the unequivocal signs of inflammation. None of the marks of inflammation have been discovered from examination of the throat during life, and, in a majority of cases, none after death; and to conclude that it existed, because there were some congestion of blood after death, would be unphilosophical and unfair. In typhus fever marks of inflammation of the brain have been discovered after death; but will any person say that is a *sthenick* disease? these appearances may be the result of a disorganization in *articulo mortis*; or, in cases of canine madness, from violent convulsions of the muscles of respiration.

The state of the intellect would furnish no slight evidence of the infection being such as I have supposed.

Arguments both for and against the *sthenick* nature of the disease have been drawn from the pulse: the scale of evidence, seems however to preponderate in favour of the doctrine I have been attempting to support, viz. that the virus exerts its paralyzing influence primarily upon the nervous system, in the effects of which, every part of the body must eventually participate, until the sufferings of the patient are terminated by death, an event which the

deadly energy of the *virus* renders extremely precipitate.

I have glanced at the resemblance which this disease bears to *tetanus* and *hysteria*, the parallel might be extended, and furnish additional argument in support of the above theory.

The method of treating this disease, will afford farther evidence of its nature : this I shall notice when I come to treat of the cure.

### PROPHYLAXIS AND CURE.

FROM the most ancient to the present time, many specifics for the prevention and cure of canine madness have been recommended, under the sanction of pretended experience, and maintained their credit for a time, until, upon the same ground, they have been rejected as ineffectual : thus the cold bath of Celsus, (which is not yet exploded,) Dampier's powder, the Turpeth mineral, the Tonquin ormskirk medicines, have each in their time been recommended as specifics. A species of *anagalis*, or chick weed ; one of the most inert and insignificant vegetables, has acquired celebrity so great, as to have gained the patronage of the Pennsylvania legislature, and under whose auspices has been resorted to by all who apprehended, or laboured under canine madness ; with what success, is attested by the melancholy evidence of numbers who fell victims to the disease, after depending on this trifling nostrum for prevention, at that period when more decisive measures might have been used with a probability of success. The credit of specifics is not, however, surprising when we remember how few of

those who received bites, are attacked with the disease, even when no remedy whatever has been applied.

The attention of physicians, is now however, directed to two methods of preventing this disease. First, the use of mercury, and secondly, excision or destruction in any other way, of the part to which the poison has been applied. Mercury was very early resorted to by physicians. Those of France recommended it, both as a prophylactic and cure, and urged the use of it, with a view of opening the pores, and eliminating the poison from the body.—In 1756, *Claude de Choisel* sent in a paper to France on this subject : M. Desault, M. Sauvrey, Cheyne and Sauvage, recommended its use in papers, sent to the college of physicians, and in pamphlets published to the world ; but subsequent unhappy experience has demonstrated it to be a very doubtful prophylactic, if not an entirely useless remedy ; for there are some cases upon record, in which the disease occurred, although the patient was at that time labouring under ptyalism, from the extensive use of mercury.

The other method mentioned, is that only in my opinion, by which we can have any hope of arresting this awful calamity, viz. destroying the part injured. Though spoken of by the ancients, it only has been relied upon by the moderns. It must, however, be acknowledged, that even this measure has in some instances failed ; but these failures have arisen, from the destructive process not having been carried to a sufficient extent, as will appear evident from a review of the manner in which I have supposed the poison to act, viz. that the first impression is of a sedative nature, and that this effect is propagated along the course of the nerve, towards the sensorium, with more or less facility, in proportion to the degree of direct



debility prevailing in the system. If this then be correct, which I am inclined to believe is the case, it is clear, that in order to prevent the occurrence of the disease, the destructive process must extend beyond the sphere of the paralyzing power of the poison: this will be known by the appearance of inflammation and suppuration, which indicate that the energy of the system is successfully exerted against the invading disease. The case that occurred in Alexandria alluded to, when speaking of the manner in which the poison affected the system, demonstrates, as far as one case can, the truth of the above theory. Here caustick, both in a solid and liquid form, was applied to the patient's hand, (for the bite was between the thumb and finger,) and was the only injury received; but the wound was completely insensible, although it was bleeding freely before the application of the caustick. A sear formed and was removed, without any sign of inflammation or suppuration, and this continued to be the case, although the caustick was applied a second and a third time: six weeks after, the patient took the disease and died. In this instance, the sensibility of the adjacent parts was evidently destroyed, by the *virus*, and the system was not saved, because the application of the caustick did not reach the extent of the affection. The favourable prognosis, it would seem, would have been drawn from a different result, that is, sensation and inflammation, by which the paralyzing power of the *virus* would have been arrested. On this ground I account for the result before mentioned, of the disease following more certainly when the *virus* was applied to a small wound, than when to a large one; a large wound making a potent demand upon the energies of the system, both inflammation and suppuration more commonly ensue, and

on the production of these our prophylaxis depends. Let it not be said that the disease has occurred even after the wounds have inflamed, unless it be ascertained that all the injuries which the person received were followed by inflammation. The smallest injuries are those that are most likely to escape notice, and are most probably the avenues through which the system is affected. In communicating the small-pox by inoculation, it is believed to be most effectual to make the incision so small as to excite as little inflammation as possible : so also with the *vaccine virus* ; and doctor Pearson has said that if an inflammatory diathesis could be induced in the system the canine disease would be prevented.

Many methods have been proposed of destroying or removing the part injured, scarification, excision and the actual and potential cautery. Scarification, as it does not comprehend all the part injured, cannot be sufficient, the actual cautery is too barbarous, and is rendered unnecessary by the refinements of modern surgery. The knife may be substituted in many instances where the injury is in deep muscular parts with very great propriety, but to the knife there are some strong objections : under certain circumstances, the dread it occasions in delicate persons is extreme. Sometimes, indeed, the knife cannot be used, as in the neighbourhood of blood vessels of considerable size, and in tendinous parts. The caustick, therefore, may be used in preference, and the caustick vegetable alkali, as directed to be prepared and used by Dr. Wilkins of Baltimore, ought to be preferred : it has the advantage of being insinuated into the interstices, of the muscular fibres and cellular substance, and thus is more likely to destroy all the parts that may have been injured by the poison. Some auxiliary means should be

attended to: the patient should avoid excess of all kinds, and habits and practices that might induce debility; and unnecessary exposure to the weather; and the system should be sustained at its proper tone by nutritious and generous diet, together with the occasional use of tonics.

To retrace the varied and unsuccessful methods which the ancients resorted to, governed by the vicissitudes of false theory, in order to cure this disease, would be a task as difficult as the result would be unprofitable, and the imbecility of modern preventives serves only to exhibit melancholy evidence of the imperfection of medical science; for to attribute any failure to the incurable nature of the disease, would be doing violence to our ideas of the benevolence of that being who has ordained that good should be commensurate with evil, and who has, no doubt, enriched the stores of nature with an antidote for every poison; two methods, as opposite in their nature as the theories which gave them rise, are now resorted to by physicians for the cure of canine madness. One class of physicians, believing the disease to be of the highest degree of *sthenick* action, have directed the antiphlogistic regimen in its fullest extent, without however realizing a favourable result. The instances demonstrating the inefficacy of this plan of treatment, are very numerous, it having been employed to a greater or less extent by physicians generally, ever since the time of the celebrated Boerhaave, who advises the extensive use of the lancet, although he appeared to be dissatisfied with the method. Doctor Johnstone details a case, in which seventy six ounces of blood were drawn, without producing any abatement of the symptoms.\* There is another detailed in the Medical essays,† in which, after the first bleeding,

\* Memoirs, Med. Soc. Lond. vol. 1, p. 243.

† Medical Essays, vol. 6.

the bandage came off, and could not be secured for an hour, during which time the patient lost an immense quantity of blood without any salutary change; and in the cases published by Drs. Physic and Rush the lancet was used freely without ameliorating the condition of the patients.\* I have already taken notice of mercury as a prophylactic, and I then also glanced at its use as a remedy. It is to me very doubtful whether any dependence can be placed upon it in this capacity. From the rapid progress of the disease, the alterative effects of this medicine never could be produced, and if they could, yet, reasoning upon the ground of its not being inflammatory, it would seem to be rather an auxiliary to the ravages of the disorder by reducing the powers of the system. There are some instances upon record, as I have before mentioned, in which the disease occurred whilst the patient was labouring under ptyalism.†

Another class of physician have pursued a different method of treatment derived from a more correct view of the nature of the disease. From the phenomena as presented in the foregoing pages, arise two principal indications. The first: to lessen or remove the morbid excitability of the whole system, and of the surface particularly: and the second, to excite the energies and maintain the tone of the nervous system, and thus arrest the progress of the disease. Important advantages would result from accomplishing the first intention as facilitating the use of the means necessary for attempting the second. The presence of hydrophobia must ever be an awkward impediment in the way of a successful treatment

\* Medical Repository, vol. 5, No. 1.

† Medical Commentaries, vol. 12, p. 304.



of the canine madness, which, together with all the convulsive affections attendant upon the disease. I have referred to a morbid excitability of the nervous system.—Such methods, therefore, should be resorted to as will most speedily effectuate this object. Sheathing the highly excitable surface by an *oleaginous* covering promises to fulfil this intention with the most flattering success.—Celsus, long ago spoke of a bath of oil being eminently serviceable in this disease, and benefit might have been expected to have resulted upon theoretical grounds or from the advantages that have been derived from the use of oil in other affections in which the excitability is morbidly increased,—as in convulsions from worms, hysteria, &c. But the success of this method was realized under the management of *doctor Dick* in canine madness, in 1803, occurring in the case of a person by the name of Cole, from the bite of a cat received about five or six weeks prior to the attack ; and, as far as a single case can warrant an expectation of similar results, this is clear and conclusive.

The doctor had waited for some years with considerable solicitude for an opportunity of trying the efficacy of some covering which should completely shelter the whole external surface from the action of the air, with a view to correct the affection called hydrophobia. The disease was perfectly established, and every attempt to swallow liquids excited the usual agonies. Melted tallow in a lukewarm state was speedily applied by means of a painter's brush to the whole surface of the body, including the head and face. Instantaneously as the process was completed, the patient drank a glassful of water without any other difficulty than what seemed to arise from apprehension upon commencing the experiment. It

was now evening, and the doctor left him under very grateful impressions, and a lively hope that he might witness a solitary cure of this terrible malady. His avocations afforded him not another opportunity of seeing his patient till towards the middle of the following day; when, to his great grief, he found the hydrophobia returned in full force, and the disease advancing to its usual termination. The coat of tallow had been rubbed off during the night. Broad bandages were now obtained, sufficient to envelop the whole body, head, trunk, and extremities. These being previously dipped in melted tallow, combined with a small portion of bees-wax, were then carefully applied, beginning with the lower extremities separately, and proceeding upwards. As soon as the process was completed the result was as in the former case. The patient drank freely without difficulty, and ate whatever his appetite required. Hope was again revived: but although hydrophobia never returned, nor any of those horrible characters of canine madness, he survived but a day or two. He lay in the mean time quiet and tranquil, gradually sinking till the vital principal became extinct. The doctor has had to regret, that the occurrence of this case should have been during the prevalence of yellow fever in Alexandria, in the management of which he had a press of employment which deprived him of the opportunity of devoting either the time or attention to it which the circumstances related, so peculiarly and strongly demanded.

The obstacles to exhibiting medicines, having been removed in fulfilling the first indication, the second may be best accomplished by a prompt and extensive use of the most powerful remedies of the tonic and stimulant class; for the ill success which has attended this plan of

treatment, appears to me to be derivable in a great measure, from the difficulty which attended the exhibition of medicines, as copiously as the violent nature and rapid progress of this disease demanded, or even, indeed, to the extent which would have been deemed requisite in a much milder disease. Therefore, after having cleansed the *primæ viæ*, by a proper evacuant, as calomel, which may be useful in removing infarctions of the abdominal viscera, opium and wine should be resorted to, as being most immediate and diffusible in their operation, and should be exhibited in such quantities, as shall be sufficient to keep up a high degree of excitement: the *volatile alkali*, æther and alkohol, may be resorted to in aid of the foregoing as may be found necessary. The propriety of relying principally upon opium and wine, will appear from the success attendant on the very large use of these medicines in tetanus, in the West Indies and in this country, which has indeed been almost unparalleled. The force or quantity of these several remedies, to be regulated according to our view of the superior rank which canine madness occupies above tetanus. Doctor Wolf, of Warsaw, relates a case of canine madness in which this plan succeeded, but it was carried to a very great extent, for the patient, in forty-eight hours, took two bottles of brandy, with the same quantity of oil, together with a large quantity of *opium* and *castor* !! Dr. Nugent relates a case that terminated favourably! in which the stimulant remedies were principally relied upon. And there is another case detailed in Wilkenson on galvanism! in which the galvanic influence received from a most powerful battery proved successful.





Book taken apart, leaves deacidified  
with magnesium bicarbonate. All  
leaves supported with lens tissue.  
Leaves mended. Resewed with new all  
rag end paper signatures & unbleached  
linen hinges. Rebound in quarter un-  
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